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EXAMINER	
LEE, SHUN K	

ART UNIT	PAPER NUMBER
2884	

NOTIFICATION DATE	DELIVERY MODE
09/22/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	09/806,457	CASPERSEN, CHRISTIAN	
	Examiner	Art Unit	
	Shun Lee	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,7,9,11,12,15,16,23,24,27,29,36,37,44 and 47-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,7,9,11,12,15,16,23,24,27,29,36,37,44 and 47-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11 August 2009 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 7, 9, 11, 12, 23, 24, 27, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malin *et al.* (US 5,377,002) in view of Hamashima *et al.* (US 4,744,663).

The claim limitation "scanning means for scanning the specimen in relation to the detector" is being treated under 35 U.S.C. 112, sixth paragraph and has been construed to cover the corresponding structure described in the specification (*e.g.*, "The scanning means may comprise a DC motor and a spindle rigidly connected to the DC motor" in lines 32-33 on pg. 4 and "The scanning means may also comprise deflecting means that may comprise a servo motor or a stepper motor connected to the member holding the specimen and thereby adapted to scan the first light beam

along a radius of the circular movement of the disc holding the specimen" in lines 2-5 on pg. 5) and equivalents thereof (MPEP § 2181).

The claim limitation "means for rotating the member" is being treated under 35 U.S.C. 112, sixth paragraph and has been construed to cover the corresponding structure described in the specification (*e.g.*, "The scanning means may comprise a DC motor and a spindle rigidly connected to the DC motor" in lines 32-33 on pg. 4) and equivalents thereof (MPEP § 2181).

The claim limitation "means for displacing the member along a radius of the rotation of the member" is being treated under 35 U.S.C. 112, sixth paragraph and has been construed to cover the corresponding structure described in the specification (*e.g.*, "The scanning means may also comprise deflecting means that may comprise a servo motor or a stepper motor connected to the member holding the specimen and thereby adapted to scan the first light beam along a radius of the circular movement of the disc holding the specimen" in lines 2-5 on pg. 5) and equivalents thereof (MPEP § 2181).

The claim limitation "scanning control means for controlling the scanning means for scanning the specimen" is being treated under 35 U.S.C. 112, sixth paragraph and has been construed to cover the corresponding structure described in the specification (*e.g.*, "The scanning control means may comprise servo means adapted control the rpm of the disc, to produce a substantially constant linear velocity of the laser spot on the disc surface, a principle well known from CD players" in lines 27-29 on pg. 16) and equivalents thereof (MPEP § 2181).

The claim limitation "storage means for storing detector signals relating to the marked objects provided by the detector and corresponding position signals provided by the scanning control means" is

being treated under 35 U.S.C. 112, sixth paragraph and has been construed to cover the corresponding structure described in the specification (*e.g.*, "The storage means may comprise magnetic, optic or electric storage media, such as hard disc drives, DAT-tapes, floppy discs, CD-ROM discs, EEPROMs, etc. which may be utilised for non-volatile storage of the coherent data sets obtained from the scanning of the specimen(s). The storage means may also comprise intermediate volatile storage means, preferably RAM, to store coherent data sets during the scanning" in lines 9-14 on pg. 14) and equivalents thereof (MPEP § 2181).

The claim limitation "means for retrieving the position signals stored in the storage means" is being treated under 35 U.S.C. 112, sixth paragraph and has been construed to cover the corresponding structure described in the specification (*e.g.*, "The storage means may be located in a personal computer (PC), which is operationally connected with the apparatus of the present invention" in lines 8-9 on pg. 14) and equivalents thereof (MPEP § 2181).

It should be noted that a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" (*Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987)) if the prior art apparatus teaches all the structural limitations of the claim (MPEP § 2114). Thus, "wherein the marked objects are marked with a fluorescent stain" was not given any patentable weight since the object marked by a fluorescent stain is not a component of the claimed apparatus and does not appear to impose any additional structural limitations on the claimed apparatus.

In regard to claim **1**, Malin *et al.* disclose (Fig. 1) an apparatus for identifying a position of objects having unknown positions and detecting a property of the objects contained in a specimen (11), the apparatus comprising:

(a) a frame (28.1);

(b) a member (13) positioned on the frame (28.1) and having a surface that is adapted to receive and hold the specimen (11);

(c) at least a first light source (2) for emitting at least a first light beam (1) towards the specimen (11) held by the member (13), wherein the first light beam (1) is adapted to provide a light spot (12) having a diameter on the specimen (11);

(d) at least one beam-splitter (18 or 62 in Figs. 1 and 4a) being arranged to reflect the first light beam (1) towards the specimen (11);

(e) at least a detector (19) for detecting light (14, 15) emitted from the objects upon interaction with the first light beam (1), the first light source (2) and the detector (19) being arranged so that a part of a light beam path from the first light source (2) to the specimen (11) is co-axial (along optical axis 34) with a part of the light (14, 15) emitted from the objects;

(f) scanning means (27.1, 27, 27.2, 28.2, 28) for scanning the entire surface of the member (13) in relation to the detector (19) along a non-linear curve (*e.g.*, " ... the whole of the surface is scanned along a spiral path ... "; column 10, lines 26-29), wherein the scanning means (27.1, 27, 27.2, 28.2, 28) comprises means (shaft 27.1 of a rotary motor 27) for rotating the member (13) and means (linear stage 27.2 on a spindle 28.2 of translation motor 28) for displacing the member (13) along a radius

of the rotation of the member (13), so as to identify the position of the objects in the entire specimen (11) and detect the property of the objects, the means (27.1, 27) for rotating and the means (27.2, 28.2, 28) for displacing being directly connected to the member (13), the member (13) being rotatable and displaceable along a radius of the rotation of the member (13);

(g) scanning control means (computer unit 22, interface 26, rotation-pulse emitter 29, translation-pulse emitter 30) for controlling the scanning means (27.1, 27, 27.2, 28.2, 28) for scanning the specimen along the non-linear curve (column 10, lines 26-29);

(h) storage means (computer unit 22, mass-storage system 23) for storing detector signals (column 9, lines 35-40) relating to the objects provided by the detector (19) and corresponding position signals (column 9, lines 41-45) provided by the scanning control means (22, 26, 29, 30);

(i) means (computer unit 22) for retrieving the position signals stored in the storage means (22, 23), and

(j) a microscope (*e.g.*, " ... scanning laser-beam microscope ... "; column 5, lines 17-23) for viewing images of the objects, wherein the scanning control means uses the retrieved position signals to place the microscope at the position of the objects to allow performing a detailed examination of the objects (column 12, lines 61-68).

The apparatus of Malin *et al.* lacks to filter through the beam-splitter fluorescent light emitted from the specimen, thereby allowing fluorescent light from fluorescently marked objects to pass through the beam-splitter to the detector and an explicit description that

the light spot diameter is between 20-150 μm. However, Malin *et al.* also disclose (column 12, lines 48-54) that the " ... unit of measurement used for LPDs is the μmLSE (=micron latex-sphere equivalent), where 1 μmLSE is the diffused-light amplitude produced by a latex sphere of 1 μm diameter ... ", (column 8, lines 30-33) that " ... LPDs are relatively small in relation to the light spot ... ", and (column 2, lines 57-62) that "In scanning, the astigmatic light beam produced by the switchable lens system covers a larger area and thus permits a larger feed offset from one revolution to the next. On the other hand, the dot-shaped light beam is used with a small feed offset and makes possible high local resolution". That is, a light spot diameter of >1 μm (*e.g.*, 50 μm) is taught or suggested by Malin *et al.* since the diameter of the light spot is larger than LPDs having diameters in units of micrometers (*e.g.*, 1 μm). Further, Hamashima *et al.* teach (column 4, lines 47-59) to provide a dichroic mirror (24 in Fig. 1) for simultaneously detecting three kinds of light information (*i.e.*, the scattered light from the edge of the pattern, the reflection from the pattern and the fluorescence or phosphorescence from the pattern) so that by using these three kinds of light information and the scanning position information of the beam spot, the desired edge detection, pattern position detection and line width and dimension measurement of the different patterns (*e.g.*, the photoresist pattern and the polysilicon pattern) are performed in a diversified manner. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a dichroic mirror as one of the at least one beam-splitter and other optical components in the apparatus of Malin *et al.*, in order to obtain reflection, scattering, and fluorescence measurements at a desired resolution (*e.g.*, from a 50 μm

light spot diameter) so as to determine defects and contamination in a diversified manner.

In regard to claim **7** which is dependent on claim 1, Malin *et al.* also disclose (Fig. 1) that the member (13) is positioned for rotation about an axis on the frame (28.1) and wherein the means (27.1, 27) for rotating the member (13) rotates the member (13) about the axis.

In regard to claim **9** which is dependent on claim 1, Malin *et al.* also disclose (Fig. 1) that the scanning control means (22, 26, 29, 30) are adapted to control the scanning means (27.1, 27, 27.2, 28.2, 28) in such a way that the non-linear curve is a substantially circular curve (*e.g.*, " ... the whole of the surface is scanned along a spiral path ... "; column 10, lines 26-29).

The claim limitation "means for sampling and digitising the detector signals and the position signals" is being treated under 35 U.S.C. 112, sixth paragraph and has been construed to cover the corresponding structure described in the specification (*e.g.*, "Each of these digitised detector and position signals is, preferably, represented by a series of digital samples generated by one or several A/D-converters" in lines 13-15 on pg. 9) and equivalents thereof (MPEP § 2181).

In regard to claim **11** which is dependent on claim 1, Malin *et al.* also disclose (Figs. 1 and 5a) means (analog-digital converter 78, rotation-pulse emitter 29, translation-pulse emitter 30) for sampling and digitizing the detector signals and the position signals.

The claim limitation "signal processing means operatively connected to the detector to detect a presence of an object based on the detector signals" is being treated under 35 U.S.C. 112, sixth paragraph and has been construed to cover the corresponding structure described in the specification (*e.g.*, "Signal processing means may subsequently retrieve and use these corresponding coherent data sets to enhance the discrimination between signals originating from target objects and false positive signals" in lines 7-9 on pg. 11 and "The storage means may be located in a personal computer (PC), which is operationally connected with the apparatus of the present invention" in lines 8-9 on pg. 14) and equivalents thereof (MPEP § 2181).

In regard to claim **12** which is dependent on claim 1, Malin *et al.* also disclose (Fig. 1) signal processing means (analyzer electronics 21, computer unit 22) operatively connected to the detector (19) to detect a presence of an object based on the detector signals.

In regard to claim **23** which is dependent on claim 1, Malin *et al.* also disclose (Fig. 1) that a mask (16) is inserted in the optical path between the specimen (11) and the detector (19), wherein the mask (16) comprises at least one transparent aperture (*e.g.*, a slit; column 7, lines 25-29).

In regard to claim **24** which is dependent on claim 23, Malin *et al.* also disclose (Fig. 1) that aperture is a substantially rectangular shape (*e.g.*, a slit; column 7, lines 25-29).

In regard to claim **27** which is dependent on claim 1, Malin *et al.* also disclose (Fig. 1) that the first light source (2) is a coherent light source (*e.g.*, 488 nm laser; column 4, lines 8-12).

In regard to claim **48** which is dependent on claim 1, Malin *et al.* also disclose that the position signals of the marked objects are angular and radial coordinates (*i.e.*, " ... polar coordinates ... "; column 10, lines 11-13).

4. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malin *et al.* in view of Hamashima *et al.* as applied to claim 1 above, and further in view of Worster *et al.* (US 5,479,252).

In regard to claims **15** and **16** which are dependent on claim 1, the modified apparatus of Malin *et al.* lacks an explicit description that the specimen has an area larger than 500 mm^2 (*e.g.*, larger than 8000 mm^2). However, Malin *et al.* also disclose (column 1, lines 18-22) that the specimen is, *e.g.*, a substrate for optical applications or a wafer. Since Malin *et al.* do not disclose and/or require a specific specimen, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified specimen of Malin *et al.* as any one of the known conventional specimens that did not require a detailed description. Further, Worster *et al.* teach (column 4, lines 58-60) that wafer diameters range from 75 mm to 200 mm. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a known conventional specimen (*e.g.*, 200 mm diameter wafer) as the unspecified specimen in the modified apparatus of Malin *et al.*

5. Claims 29, 36, 37, 47, and 49-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malin *et al.* (US 5,377,002) in view of Hamashima *et al.* (US 4,744,663) and Dixon *et al.* (US 5,381,224).

In regard to claims **29**, **36**, **47**, and **49-51**, the cited prior art is applied as in claims 1 and 48 above. The method of Malin *et al.* lacks that the object is a fluorescently marked biological cell or a fluorescently marked microorganism and wherein the specimen has an area larger than 500 mm^2 (or larger than 8000 mm^2). Dixon *et al.* teach (column 1, lines 5-20; column 3, lines 10-61) that an apparatus for measuring both scattered light and fluorescence can be used for both macroscopic semiconductor specimens and macroscopic biomedical specimens (*i.e.*, macroscopic specimens having a size larger than 1 mm X 1 mm). Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention that the modified method of Malin *et al.* can be used for both macroscopic semiconductor specimens and macroscopic biomedical specimens (*e.g.*, a macroscopic biomedical specimen comprising fluorescently marked biological cells).

In regard to claim **37** which is dependent on claim 36, the cited prior art is applied as in claim 11 above.

6. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malin *et al.* in view of Hamashima *et al.* as applied to claim 1 above, and further in view of Raz *et al.* (US 6,049,421).

In regard to claim **44** which is dependent on claim 1, the modified apparatus of Malin *et al.* lacks an explicit description that the detector comprises a CCD device. Since Malin *et al.* do not disclose and/or require a specific detector, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified detector of Malin *et al.* as any one of the known conventional detectors that did not

require a detailed description. Further, Raz *et al.* teach (column 2, lines 26-37) to provide a CCD device for scanning a substrate in order to obtain reasonable speed resolution. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a known conventional detector (*e.g.*, a CCD) as the unspecified detector in the modified apparatus of Malin *et al.*

Response to Amendment

7. The declaration under 37 CFR 1.132 filed 11 August 2009 is insufficient to overcome the rejection of claims 1, 7, 9, 11, 12, 23, 24, 27, and 48 based upon the Malin *et al.* and Hamashima *et al.* references applied under 35 U.S.C. 103; claims 15 and 16 based upon the Malin *et al.*, Hamashima *et al.*, and Worster *et al.* references applied under 35 U.S.C. 103; claims 29, 36, 37, 47, and 49-51 based upon the Malin *et al.*, Hamashima *et al.*, and Dixon *et al.* references applied under 35 U.S.C. 103; and claim 44 based upon the Malin *et al.*, Hamashima *et al.*, and Raz *et al.* reference applied under 35 U.S.C. 103 as set forth in the last Office action because:

Declarant argues (paragraph 8) that the purpose of Malin *et al.*'s system is detection of light diffracted at large angles from the surface defects. Examiner respectfully disagrees. Malin *et al.* state (column 6, lines 15-23) that the " ... closer the position of the dark-field stop 61 to the objective 9, the smaller is the vignetted area in the diffused-light cone and thus the better is the solution ... " and (column 7, lines 7-17) that for " ... the measurement of surface textures due to defects, ... to allow the passage of diffused light close to the optical axis, that proportion of the diffused-light cone 14 effectively blocked by the dark-field stop 61 must

be as small as possible ... ". Therefore, Malin *et al.* expressly teach to detect light diffracted at very small angles (*i.e.*, "diffused light close to the optical axis") by surface defects.

Declarant argues (paragraphs 10 and 11) that the Malin *et al.* system is configured according to a figure (Fig. 1 on pg. 2 of the declaration under 37 CFR 1.132 filed 11 August 2009) illustrating a portion of illumination light from a "Light Source" incident on a first side of a sample is blocked by a "Dark Field Patch Stop" (and the figure also illustrates that the "Only scatter light transmitted" is on a second side (opposite the first side) of the sample). Examiner respectfully disagrees. Malin *et al.* state (column 6, lines 36-59) that the " ... light beam 1 is deflected ... to the dark-field deflection system 8, which in turn deflects it. ... the light beam 1 strikes the substrate perpendicularly to its surface 10, ... The diffused and deflected part of the light 14 are collected under the angle of the numerical aperture of the objective 9 ... ". Thus, Malin *et al.* expressly teach a system wherein a "light beam" is "perpendicularly" incident on the first side a sample is not blocked by a dark-field stop (and the "diffused and deflected part of the light" is collected from the same first side). Therefore, the Malin *et al.* system is clearly not configured according to Fig. 1 on pg. 2 of the declaration under 37 CFR 1.132 filed 11 August 2009.

Declarant argues (paragraphs 10 and 11) that Malin *et al.* system is configured with a ratio of 16/24 (dark stop/condenser lens) as the dark field aperture. 16/24~0.67. Thus declarant appears to argue that ~67% of the light beam (1 in Figs. 1, 2b, and 4a) in the Malin *et al.* system is blocked by a dark-field stop (61 of dark-field stop assembly 18 in Fig. 4a) before being incident on a sample (11 in Figs. 1 and 2b). Examiner respectfully disagrees. Malin *et al.* state (column 5, lines 48-63) that the " ... centre of the

dark-field stop's carrier plate is coated with a material that reflects the light of beam 1 ... ". Therefore, the light beam (1 in Figs. 1, 2b, and 4a) in the Malin *et al.* system is not blocked by a dark-field stop (61 of dark-field stop assembly 18 in Fig. 4a) before being "perpendicularly" incident on a sample (11 in Figs. 1 and 2b).

Declarant argues (paragraphs 10 and 11) that the experiments clearly demonstrate the dark field upright microscope illustrated in Fig. 1 (on pg. 2 of the declaration under 37 CFR 1.132 filed 11 August 2009) with a ratio of 16/24 (dark stop/condenser lens) as the dark field aperture is incapable of detecting fluorescent signals. Examiner respectfully disagrees. The only conclusion that can be drawn from the data presented by declarant is that the combination of illumination light (scattered through the "Direct Illumination Block" and also passing through the "dichroic filter" not illustrated in Fig. 1 but described on pg. 3 of the declaration under 37 CFR 1.132 filed 11 August 2009) and fluorescence (from an unspecified concentration of an unspecified fluorescent material) collected by a 0.7 NA or 0.6 NA objective can no longer be detected by an unspecified photomultiplier tube when the unspecified illumination intensity is reduced by ~67%. For example, declarant fails to provide any evidence or explanation that if the illumination intensity is increased by ~67%, the dark field upright microscope illustrated in Fig. 1 (on pg. 2 of the declaration under 37 CFR 1.132 filed 11 August 2009) is incapable of detecting fluorescent signals. Therefore, the experiments presented by declarant clearly fails demonstrate that a dark field upright microscope is incapable of detecting fluorescent signals.

Declarant argues (paragraphs 10 and 11) that there is no teaching in Malin *et al.* directed towards the present invention and therefore, Malin *et al.* provides no basis to formulate the present invention. Examiner respectfully disagrees for the reasons discussed above.

Declarant argues (paragraph 12) that the measurements reliably present the difference between the apparatus of the present invention and Malin *et al.* Examiner respectfully disagrees. As discussed above, the Malin *et al.* system is clearly not configured according to Fig. 1 on pg. 2 of the declaration under 37 CFR 1.132 filed 11 August 2009. In addition, independent claim 1 recites "at least one beam-splitter being arranged to reflect the first light beam towards the specimen and filter light emitted from the specimen, thereby allowing fluorescent light from the marked objects to pass through the beam-splitter to the detector". Thus claimed apparatus is also clearly not configured according to Fig. 1 on pg. 2 of the declaration under 37 CFR 1.132 filed 11 August 2009. Therefore, the measurements presented by declarant are immaterial to both the instant claims and the cited prior art.

Declarant argues (paragraph 12) that the measurements also illustrate the unsuitability of any system, which contains an obstruction in the fluorescence collection such as a dark field aperture stop or any other object blocking the fluorescence reception. Examiner respectfully disagrees. Fig. 1 on pg. 2 of the declaration under 37 CFR 1.132 filed 11 August 2009 clearly illustrates that was no obstruction in the fluorescence collection such as a dark field aperture stop or any other object blocking the fluorescence reception. Therefore, the measurements presented by declarant fail to

be relevant to any system which contains an obstruction in the fluorescence collection such as a dark field aperture stop or any other object blocking the fluorescence reception.

Declarant argues (paragraph 13) that in order to achieve a fine resolution when scanning of the surface, the incident illuminating beam must necessarily have a relatively small numerical aperture, which unavoidably results in an obstruction of fluorescent light from the sample. Examiner respectfully disagrees. Fig. 1 on pg. 2 of the declaration under 37 CFR 1.132 filed 11 August 2009 clearly illustrates a light spot size on a first side of the sample produced by a "Condenser Lens" from the "Light source". Fig. 1 also illustrates that the "Only scatter light transmitted" is collected by an "Objective Lens" on a second side (opposite the first side) of the sample. Therefore, declarant fails to provide any evidence or explanation that the "Condenser Lens" must necessarily have a relatively small numerical aperture, which unavoidably results in an obstruction of fluorescent light from the sample.

Declarant argues (paragraph 14) that the inclusion of a dichroic mirror in Malin *et al.*'s apparatus will not overcome the limitation introduced by the dark field stop and therefore no fluorescence based meaningful result can be obtained unless the dark field stop is removed from Malin *et al.*'s apparatus. Examiner respectfully disagrees. As discussed above, the measurements presented by declarant are immaterial to both the instant claims and the cited prior art. Further, the experiments presented by declarant clearly fails demonstrate that a dark field upright microscope is incapable of detecting fluorescent signals. Therefore, declarant's arguments are not persuasive.

Declarant argues (paragraph 14) that the apparatus of Malin *et al.* relies on using a dark field configuration, using a dark field stop to block light scattered directly back into the receiver optics and to detect light diffracted at large angles from the surface defects. Examiner respectfully disagrees. Malin *et al.* state (column 6, lines 15-23) that the " ... closer the position of the dark-field stop 61 to the objective 9, the smaller is the vignetted area in the diffused-light cone and thus the better is the solution ... " and (column 7, lines 7-17) that for " ... the measurement of surface textures due to defects, ... to allow the passage of diffused light close to the optical axis, that proportion of the diffused-light cone 14 effectively blocked by the dark-field stop 61 must be as small as possible ... ". Therefore, Malin *et al.* expressly teach to detect light diffracted at very small angles (*i.e.*, "diffused light close to the optical axis") by surface defects.

Declarant argues (paragraph 15) that the apparatus of Malin *et al.* is not capable of measuring the fluorescence from microscopic samples because it requires blocking of backscattered light with a dark field aperture stop. Examiner respectfully disagrees. As discussed above, the measurements presented by declarant are immaterial to both the instant claims and the cited prior art. Further, the experiments presented by declarant clearly fails demonstrate that a dark field upright microscope is incapable of detecting fluorescent signals. Therefore, declarant's arguments are not persuasive.

Declarant argues (paragraph 15) that there does not exists any provision of including a dichroic mirror in the apparatus without disrupting the working principle of Malin *et al.* In response to applicant's argument, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested

in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Further, declarant fails to provide any evidence or explanation as to how a dichoric filter would disrupt the working principle of Malin *et al.* Therefore, declarant's arguments are not persuasive.

In view of the foregoing, when all of the evidence is considered, the totality of the rebuttal evidence of nonobviousness fails to outweigh the evidence of obviousness.

Response to Arguments

8. Applicant's arguments filed 11 August 2009 have been fully considered but they are not persuasive.

Applicant argues that Malin *et al.* do not relate to detection of fluorescent light. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that dark field illumination minimizes the quantity of directly-transmitted (un-scattered) light entering the image plane, collecting only the light scattered by the sample and that this is illustrated in Figs. 4a-4c and column 5, line 48 - column 6, line 56 of Malin *et al.*, where it discloses that the implementation of a dark field stop is an essential part of the system. Examiner respectfully disagrees. Malin *et al.* state (column 6, lines 36-59) that the " ... light beam 1 is deflected ... to the dark-field deflection system 8, which in turn deflects it. ... the light beam 1 strikes the substrate perpendicularly to its surface

10, ... The diffused and deflected part of the light 14 are collected under the angle of the numerical aperture of the objective 9 ... ". Thus, Malin *et al.* expressly teach a system wherein a "light beam" is "perpendicularly" incident on the first side a sample is not blocked by a dark-field stop (and the "diffused and deflected part of the light" is collected from the same first side). Therefore, the Malin *et al.* system is clearly not a dark field illumination system.

Applicant argues that a dark field stop in the light path will stop the light emitted from the fluorescently marked objects to a degree where detection becomes impossible. Examiner respectfully disagrees. Malin *et al.* state (column 6, lines 15-23) that the " ... closer the position of the dark-field stop 61 to the objective 9, the smaller is the vignetted area in the diffused-light cone and thus the better is the solution ... " and (column 7, lines 7-17) that for " ... the measurement of surface textures due to defects, ... to allow the passage of diffused light close to the optical axis, that proportion of the diffused-light cone 14 effectively blocked by the dark-field stop 61 must be as small as possible ... ". Thus, Malin *et al.* expressly teach that proportion of the diffused-light cone effectively blocked by the dark-field stop must be as small as possible. Therefore, applicant's arguments are not persuasive.

Applicant argues that fluorescence microscopy is a bright field microscope and relies upon the light from the lamp source being gathered by the sub-stage condenser and shaped into a cone whose apex is focused at the plane of the specimen. Examiner respectfully disagrees. Bright field microscope is where light is transmitted through a sample. However, a fluorescence microscope (some times called an epifluorescent microscope) is where fluorescence is emitted from a sample. Therefore, fluorescence microscopy cannot be performed on a bright field microscope without modification.

Applicant argues that the principle of operation in Malin teaches away from that in the claimed invention because Malin *et al.* use a dark field stop as an essential element since this restricts any possible detection of fluorescence. Examiner respectfully disagrees. As discussed above, Malin *et al.* expressly teach that proportion of the diffused-light cone effectively blocked by the dark-field stop must be as small as possible. Therefore, applicant's arguments are not persuasive.

Applicant argues that Malin *et al.* cannot be used for detecting fluorescent stain due to the presence of the dark field stop which inherently stops light emitted from a fluorescent stain in the objective. Examiner respectfully disagrees. First, applicant fails to provide any evidence or explanation the dark field stop must be in the objective. Further, applicant fails to provide any evidence or explanation that all dark field stop inherently stops light emitted from a fluorescent stain. On the contrary, the cited prior clearly shows a dark field stop outside an objective (*e.g.*, Fig. 1 of Malin *et al.* illustrates a dark field stop assembly 18 outside an objective 9). Further, the cited prior teach that the size of a dark field stop can be selected to transmit large portions of light from a sample. Therefore, applicant's arguments are not persuasive.

Applicant argues that "wherein the marked objects are marked with a fluorescent stain" does in fact impose an additional structural limitation to the claimed apparatus. Examiner respectfully disagrees. It is noted that applicant fails to particularly point out what additional structural limitation is implied by "wherein the marked objects are marked with a fluorescent stain". Therefore, applicant's arguments are not persuasive.

Applicant argues that Malin *et al.* do not teach or suggest a light spot diameter between 20-150 μm. Examiner respectfully disagrees. MPEP § 2144.05 indicates that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. In this case, Malin *et al.* state (column 12, lines 48-54) that the " ... unit of measurement used for LPDs is the μmLSE (=micron latex-sphere equivalent), where 1 μmLSE is the diffused-light amplitude produced by a latex sphere of 1 μm diameter ... " and (column 8, lines 30-33) that " ... LPDs are relatively small in relation to the light spot ... ". Thus Malin *et al.* expressly teach a light spot relatively large in relation to a latex sphere of 1 μm diameter. Malin *et al.* also state (column 2, lines 57-62) that "In scanning, the astigmatic light beam produced by the switchable lens system covers a larger area and thus permits a larger feed offset from one revolution to the next. On the other hand, the dot-shaped light beam is used with a small feed offset and makes possible high local resolution". Thus, Malin *et al.* expressly teach that light spot size is selected depending on the desired scanning resolution. That is Malin *et al.* teach or suggest an adjustable spot size that is larger than 1 μm (*e.g.*, 20 μm), in order to achieve a desired scanning resolution. Therefore, the adjustable spot size taught by Malin *et al.* is expressly taught as a result-effective variable for achieving a desired scanning resolution.

Applicant argues that Malin *et al.* is silent about enhancing the signal-noise ratio using the spot diameter and fail to recognize the spot size as a result-effective variable to enhance the signal-noise ratio. In response to applicant's argument, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences

would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Applicant argues that in view of the above, Malin *et al.* not only teaches away from the claimed invention and has inoperability limitation to measure fluorescence emissions, as evidenced by experimental data, but also fails to address the issue of signal-noise ratio and recognize the spot size as a result-effective variable to enhance the signal-noise ratio. Examiner respectfully disagrees for the reasons discussed above.

Applicant argues that a small area device, as described in the present invention, will not lead to any signal in Hamashima *et al.* set up. Applicant's arguments are not persuasive since applicant fails to describe what a small area device (as described in the present invention) is and applicant also fails to describe how the small area device is incorporated in the Hamashima *et al.* set up.

Applicant argues that a figure identical to Fig. 6 of a Declaration under 37 C.F.R. § 1.132 as filed concurrently herewith (see below), where the shutter is completely closed shows that the Hamashima *et al.* configuration will be unable to solve the problem which is addressed by the present invention. Examiner respectfully disagrees. The only conclusion from the illustrated figure is that there is no signal from a detector when a shutter is completely closed. Therefore, applicant's arguments are not persuasive.

Applicant argues that adding a dichroic mirror does not provide the apparatus of Malin *et al.* with a possibility of detecting any fluorescent emission from the object, since such emission cannot pass the dark field stop, which is an essential part of Malin *et al.*

and if the dichroic mirror is used as an additional component along with the dark field stop in the system of Malin *et al.*, then the dichroic mirror would not collect the directly-transmitted light and therefore would not be reading over the claimed invention. Examiner respectfully disagrees. First it should be noted that independent claim 1 recites "at least one beam-splitter being arranged to reflect the first light beam towards the specimen and filter light emitted from the specimen, thereby allowing fluorescent light from the marked objects to pass through the beam-splitter to the detector". Thus the claimed invention is clearly not collecting the directly-transmitted light as argued by applicant. Further, in response to applicant's argument, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, the scanning apparatus of Malin *et al.* is for measuring using scattered light. The scanning apparatus of Hamashima *et al.* is for measuring using both scattered light and fluorescence. Thus the combined teachings of the references would have suggested to those of ordinary skill in the art, a scanning apparatus for measuring that uses both scattered light and fluorescence by adding a dichroic mirror. Therefore, the combined teachings of the cited prior art would have suggested the limitations of independent claim 1 or their dependent claims to those of ordinary skill in the art.

Applicant argues that the proposed modification or combination of the prior art would change the principle of operation of Malin *et al.* since Malin *et al.*'s system would cease to operate in the area of dark field microscopy if the dark field stop is replaced by a dichroic mirror of Hamashima *et al.* Examiner respectfully disagrees. The combined teachings of the references would have suggested to those of ordinary skill in the art, a scanning apparatus for measuring that uses both scattered light and fluorescence by adding a dichroic mirror. Therefore, the combined teachings of the cited prior art would not change the principle of operation of Malin *et al.* since the proposed modification or combination of the prior art measure both scattered light (using a dark field stop) and fluorescence (using a dichroic mirror).

Applicant argues that the additional teaching of Worster *et al.* will not render the claims *prima facie* obvious. Examiner respectfully disagrees for the reasons discussed above.

Applicant argues that the additional teaching of Dixon *et al.* will not render the claims *prima facie* obvious. Examiner respectfully disagrees for the reasons discussed above.

Applicant argues that Malin *et al.* do not teach filtering through the beam splitter of the light emitted from the specimen. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091,

231 USPQ 375 (Fed. Cir. 1986). Further, examiner respectfully disagrees with applicant restated arguments for the reasons discussed above.

Applicant argues that equivalence principle in optics proves the equivalence between the two setups in principle, and therefore, the substitution of the reflective geometry with the transmission geometry is allowed in order to illustrate the effect of the dark field stop in the light collection. Examiner respectfully disagrees. First, applicant fails to provide evidentiary support for "equivalence principle in optics". Further, applicant fails to provide any evidence that a dark field stop in the illumination beam is equivalent to a dark field stop in the transmitted beam. In addition, applicant fails to provide any evidence that a dark field stop in a transmitted beam is equivalent to a dark field stop in a reflected beam. Moreover as discussed above, the measurements presented by declarant are immaterial to both the instant claims and the cited prior art since both the Malin *et al.* system and claimed apparatus are clearly not configured according to Fig. 1 on pg. 2 of the declaration under 37 CFR 1.132 filed 11 August 2009. Therefore, applicant's arguments are not persuasive.

Applicant argues that the geometry based rejection lacks evidentiary evidence which is contradictory to the decision as laid down in *In re Grose*, 592 F.2d 1161, 201 USPQ 57 (CCPA 1979), which states "when an examiner relies on a scientific theory, evidentiary support for the existence and meaning of that theory must be provided". Examiner respectfully disagrees. It is important to recognize that the grounds of rejection are not based on geometry. Rather, the grounds of rejection are based on the cited prior art as discussed above. On the contrary, it is applicant's arguments that are based on "equivalence principle

in optics" and/or "geometry" which lacks evidentiary support. Therefore, applicant's arguments are not persuasive.

Applicant argues that the figure at page 12 of the 10 July 2009 Reply is equivalent to Malin *et al.*'s system since the effect at the detector of the stop placed to block either the excitation light or a portion of the light reflected from the sample would be same. Examiner respectfully disagrees. A dark-field stop in the illumination beam results in light incident at an angle which is not perpendicular to the sample surface. A dark-field stop in a transmitted beam is clear not dark-field microscopy. A dark-field stop in a reflected beam can be position to remove specularly reflected light. Thus the location of a dark-field stop have different modes of operation that produces different results. Therefore, applicant's arguments are not persuasive.

Applicant argues that Malin *et al.* do not make any clear and unambiguous suggestion regarding the size of the dark stop. Examiner respectfully disagrees. First it is noted that applicant fails to provide any evidence that a ratio of 16/24 (dark stop/condenser lens) is suggested by Malin *et al.* On the contrary, Malin *et al.* state (column 6, lines 15-23) that the " ... closer the position of the dark-field stop 61 to the objective 9, the smaller is the vignetted area in the diffused-light cone and thus the better is the solution ... " and (column 7, lines 7-17) that for " ... the measurement of surface textures due to defects, ... to allow the passage of diffused light close to the optical axis, that proportion of the diffused-light cone 14 effectively blocked by the dark-field stop 61 must be as small as possible ... ". Thus, Malin *et al.* expressly teach that proportion of the diffused-light cone effectively blocked by the dark-field stop must be as small as possible. Therefore, applicant's arguments are not persuasive.

Applicant argues that because of general property of dark field stop to minimize the quantity of directly-transmitted, fluorescence would not be detected. Examiner respectfully disagrees. It is noted that the 11 August 2009 declaration stated that "Fluorescence is generally randomly scattered in all directions". As discussed above, the cited prior teach that the size of a dark field stop can be selected to transmit large portions of light from a sample. Therefore, applicant's arguments are not persuasive for the reasons discussed above.

Conclusion

9. All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. L./
Examiner, Art Unit 2884

/David P. Porta/
Supervisory Patent Examiner, Art Unit 2884